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**BIBLIOGRAPHY OF  
RUSSIAN MATHEMATICS  
BOOKS**

**By GEORGE E. FORSYTHE**

**CHELSEA PUBLISHING COMPANY  
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1956**



### **PUBLISHERS' PREFACE**

The Publishers wish to thank Mathematical Reviews for kindly allowing them to copy a part of its table of transcriptions of the Cyrillic alphabet. It should be noted, incidentally, that whereas the Library of Congress, whose transcription system is essentially followed herein, transcribes certain letters of the Cyrillic alphabet as  $\widehat{zh}$ ,  $\widehat{kh}$ ,  $\widehat{ch}$ ,  $\widehat{sh}$ , and  $\widehat{shch}$ , this book transcribes them simply as  $zh$ ,  $kh$ ,  $ch$ ,  $sh$ , and  $shch$ , respectively. Since  $h$  does not correspond to any letter of the Cyrillic alphabet, this difference should not trouble those used to the Library of Congress system.

The Publishers also wish to thank publicly those scientists and librarians who have been kind enough to suggest titles to be included in their continuing program of Russian scientific translations.

## PREFACE

The present Survey has grown out of a report written in 1952 at the National Bureau of Standards, Los Angeles, but is very much amplified, and revised, in its present form. It is intended to be a list, arranged both by author and subject, of all known Russian mathematical books published since 1930 that a practising mathematician might wish to consult, if he could read them. The purposes and scope of the Survey are stated in more detail in the Introduction.

In pursuing this bibliographical study I have been continually stimulated by the interest and help of Prof. I. S. Sokolnikoff, who understands so well the value of Soviet contributions to world mathematics. Conversations with him convinced me several years ago of the importance of making Soviet work known as widely as possible.

I am grateful to Dr. J. V. Wehausen for his continuing assistance in bibliographical matters, and for encouraging me to use the files of "Mathematical Reviews." I wish also to thank the following persons for having submitted material for this Survey: Mr. A. Buschke, Dr. J. M. Danskin, Prof. A. T. Lonseth, Mr. Jerry Shmoys, Dr. M. Yanowitch, and any one whom I may have unintentionally omitted.

I want to acknowledge the painstaking collating and typing of this difficult material by Mrs. Ruthanne Clark, Mrs. Vendia Gordanier, and Mrs. Gertrude Reider. The accuracy attained would not have been possible without them; the remaining errors are almost certainly mine.

New York University  
November 1955

George E. Forsythe

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## INTRODUCTION

Perhaps even more than mathematicians in Europe generally, those in Russia have traditionally devoted much effort to the preparation of good expository monographs. Since World War II there has been a great increase in this work, resulting in a mathematical literature extensive in quantity and high in quality. Among others, some of the very best research men are engaged in this work. The exposition, being usually leisurely and full of examples, is well suited to self instruction. The size of the editions is large.

While many Russian books have counterparts in the Western literature, many do not. I shall select for mention four related to my own field — numerical analysis. The first, L. V. Kantorovich and V. I. Krylov's "Approximate Methods of Higher Analysis," is unparalleled. The third edition (1950) of 5000 copies includes in its 695 pages numerous references to the world literature and many numerical examples, elegantly explained in great detail. The seven chapters cover the following: 1. Solution of partial differential equations by infinite series; 2. Approximate solution of Fredholm integral equations; 3. Difference methods; 4. Variational methods; 5. Conformal mapping of regions; 6. Application of conformal mapping to the solution of basic problems for canonical regions; 7. Schwarz's method.

There are two excellent recent books by S. G. Mikhlin: "Direct Methods In Mathematical Physics" (1950), and "The Problem of the Minimum of a Quadratic Functional" (1952). Both of these are self-contained and begin with background material in Hilbert space. The first deals concretely with the methods of Ritz and Galerkin, the method of least squares, and the method of lines, and includes numerous concrete examples. The second book gives more attention to associated theoretical questions.

Finally, there is V. N. Faddeeva's "Computational Methods of Linear Algebra" (1950). The book treats various

direct and iterative methods of finding eigenvalues and inverses of matrices. The treatment is moderately comprehensive and is notably elegant. The first chapter is a splendid introduction to the algebra and analysis of finite matrices, and the author has often used this chapter as a textbook.

It seems clear that many of the Russian mathematical books would be of the greatest value to mathematicians and students, if only they were readily available. There seem to be three difficulties to be overcome here. First and most fundamental is ignorance of the existence of this literature. Second, people are not generally aware of how to obtain Soviet books and periodicals. Third, there is the language barrier.

I believe the third difficulty will take care of itself as soon as the first two are met. Enough mathematicians will learn Russian when the need is sufficiently evident. In the meantime a considerable number of these books is appearing in German translation and some in English.

As for the second difficulty, getting Soviet material is not expensive, but does require effort and time. Those interested should consult a librarian with experience in Soviet acquisitions.

And now for the first difficulty. "Mathematical Reviews" is, of course, doing superlative work in collecting and reviewing books and articles, and the majority of the books listed below have been noted or reviewed in that publication. Because those reviews are spread through 16 volumes of "Mathematical Reviews", the compiler feels that it will prove worth while to bring these titles together in a single list. It is hoped thus to keep this literature before Western mathematicians and thereby contribute to its use. I know of no comparable list.

It is obvious from the journals that Soviet workers are reading the Western literature much more closely than most of us follow their work. Moreover, they have translated most of the best Western books and many articles into Russian. It seems to me inevitable that such a selective diffusion of mathematics, if long sustained, will result in most Soviet mathematicians knowing more about the subject than most of us. In this regard I am

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more concerned about applied mathematics than pure mathematics for two reasons. First, I believe that through "Mathematical Reviews" the new ideas in pure mathematics are transmitted to us better than those in applied mathematics. Second, the Russians seem to enjoy a better position relative to the West in applied mathematics than in pure mathematics. (Professor Sokolnikoff, however, is concerned equally about pure and applied mathematics.)

To get a picture of the recent expansion in research and education behind the large growth in Soviet scientific publication, one should consult the following articles on Soviet science and technology: (i) I. S. Sokolnikoff, "Organized Research in the USSR," "Scientific Monthly," Vol. 72 (1951), pp. 164-168; (ii) Benjamin Fine, "New York Times," November 7, 1954, Section I, p. 1; (iii) Eric Ashby, "New York Times Magazine," April 18, 1954, p. 13; (iv) Anonymous, "Newsweek" March 1, 1954, pp. 46-50.

The rules for admitting a book to the Survey are detailed below. Although the list includes over 600 titles, it is certainly incomplete. The author's main sources have been the following:

(1) The two bibliographical books, "Mathematics in the USSR for the Thirty Years 1917 - 1947" (see below under Kurosh), and "Mechanics in the USSR for the Thirty Years 1917 - 1947" (see below under V. Z. Vlasov).

(2) The book-lists in those numbers of "Uspekhi Matematicheskikh Nauk" since 1946 that are available in Los Angeles.

(3) "Mathematical Reviews" and the master card file in its editorial office.

(4) The Russian collection of the Brown University Science Library, begun by the late Professors R. C. Archibald and J. D. Tamarkin.

(5) Bibliographies in recent Russian books and articles.

(6) Book catalogues.

(7) The Russian collection of the Numerical Analysis Research library at the University of California, Los Angeles.

The subject matter of the books listed is mathematics, pure and applied, including tables beyond the most elementary, but excluding descriptive geometry. There are a few titles on



quantum mechanics and other branches of mathematical physics, and more on mechanics, mathematical machines and nomography, but these topics are far from completely covered. For textbooks, the subject matter is more advanced than calculus.

The list is confined to books, excluding dissertations. Because of their mathematical interest, most of the serial monographs (Trudy) of the Steklov mathematical institute have also been included. The books in the list have been published (or reprinted) in Russian or Ukrainian since 1930. Translations into Russian are omitted. Books have been judged on whatever evidence was available.

Of the many methods for transliterating the Cyrillic alphabet, the Library of Congress (LC) system has been selected, because of its convenience for librarians. It is listed below, together with the system now used by "Mathematical Reviews" (MR). For the systems used earlier by "Mathematical Reviews" see that journal, Vol. 7 (1946), p. 619.

The reader should be warned that Soviet publishers are rather informal in dating books, numbering editions, changing titles, and so forth. Thus the second edition of a book may appear with a changed title, while, on the other hand, the third edition may be little more than a reprint of the second edition with the date changed. These factors limit the ultimate precision of any bibliography of Russian books.

# TRANSCRIPTION SYSTEM

Russian Letter	Cap.	Ital.	This book U. S. Library of Congress	Zentralblatt für Mathematik	Bulletin Analytique	Applied Mechanics Reviews	Mathematical Reviews
А	a		a	a	a	a	a
В	b		b	b	b	b	b
В	v		v	v	v	v	v
Г	g		g	g	g	g	g
Д	d		d	d	d	d	d
Е	e		e	e	e	e	e
Е	é		é	é	é	é	é
Ж	zh		zh	zh	zh	zh	zh
З	z		z	z	z	z	z
И	i		i	i	i	i	i
И	ik		ik	ik	ik	ik	ik
К	k		k	k	k	k	k
Л	l		l	l	l	l	l
М	m		m	m	m	m	m
Н	n		n	n	n	n	n
О	o		o	o	o	o	o
П	p		p	p	p	p	p
Р	r		r	r	r	r	r
С	s		s	s	s	s	s
Т	t		t	t	t	t	t
У	u		u	u	u	u	u
Ф	f		f	f	f	f	f
Х	kh		kh	kh	kh	kh	kh
Ц	ts		ts	ts	ts	ts	ts
Ч	ch		ch	ch	ch	ch	ch
Ш	sh		sh	sh	sh	sh	sh
Щ	shch		shch	shch	shch	shch	shch
Ъ	"		"	"	"	"	"
Ы	y		y	y	y	y	y
Ь	ë		ë	ë	ë	ë	ë
Э	é		é	é	é	é	é
Ю	ju		ju	ju	ju	ju	ju
Я	ja		ja	ja	ja	ja	ja



## ABBREVIATIONS

M.	Moscow
L.	Leningrad
G.	Gosudarstvennoe izdatel'stvo tekhniko-teoreticheskoy literatury, abbreviated as "Gostekhizdat" (State publisher of technical-theoretical literature) Moscow or Leningrad, or both. Earlier abbreviations were: ONTI, GTTI, etc.
Izd. AN SSSR	Publishing house of the Akademiya nauk (Academy of Sciences) of the USSR
Izd. AN Ukr. SSR	Publishing house of the Akademiya nauk (Academy of Sciences) of the Ukrainian SSR
Izd. univ.	Izdatel'stvo universiteta (Publishing house of the university)
Trudy mat. inst. Steklova	Akademiya nauk SSSR, Leningrad. Matematicheskii institut imeni V. A. Steklova., Trudy
pp.	pages
c.	(number of) copies printed, according to information given in the book or in Soviet bibliographical material.
MR	Mathematical Reviews
Zb	Zentralblatt für Mathematik und ihre Grenzgebiete
MTAC	Mathematical Tables and Other Aids to Computation

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Vol. 7 (Hydraulics), 1937, 410 pp.; 3000 c.;

Vol. 8 (Elasticity, railways, autos), 1937, 291 pp., 3000 c.;

Vol. 9 (Mathematics, astronomy, reports, lectures, character-  
istics and biography), 1937, 450 pp., 3000 c.

Lectures (Separate books)

Issue 1 (Theoretical basis of aeronautics), 1938, 539 pp., 3000 c.;

Issue 2 (Theoretical basis of aeronautics), 1939, 206 pp., 3000 c.;

Issue 3 (Theoretical mechanics), 1939, 420 pp., 3000 c.;

Issue 4 (Analytical mechanics, etc.), 1940, 461 pp., 3000 c.;

Issue 5 (Kinematics, statics, dynamics of a particle), 1939, 403 pp., 3000 c.

Issue 6 (Mechanics of a system, dynamics of a rigid body), 1939, 294 pp., 3000 c.;

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**ZHUKOVSKIĬ, N. E., c** Sobranie sochineniĭ.

Collected works

Vol. 1 (General mechanics, mathematics and astronomy), 1948, 656 pp., 2500 c.;

Vol. 2 (Hydrodynamics), 1949, 764 pp., 2500 c.;

Vol. 3 (Hydraulics, applied mathematics);

Vol. 4 (Aerodynamics), 1949, 652 pp., 2500 c.;

Vol. 5 (Theoretical mechanics, hydrostatics and hydrodynamics, theory of attraction), 1949, 984 pp., 2500 c.;

Vol. 6 (Theoretical principles of aeronautics), 1950, 623 pp., 2500 c.;

Vol. 7 (Speeches, reports...), 1950, 608 pp.

**ZHUKOVSKIĬ N. E., d** Teoreticheskaya mekhanika

Theoretical mechanics, 2nd ed., G., 1952, 811 pp., 2500 c.;

(MR Vol. 13, p. 173; 1st ed., 1950.)

**ZOLTAREV**

**ZHUKOVSKIĬ, N. E., e** Izbrannye sochineniâ  
Selected papers, G., 1948 (MR Vol. 11, p. 574.)

Vol. 1, 391 pp., 3500 c.;

Vol. 2, 422 pp., 3500 c.

**ZHURAVSKIĬ, A. M.,** Spravochnik po ellipticheskim funktsiâ  
Handbook on elliptic functions, M.-L., Izd. AN SSSR, 1941,  
235 pp.

**ZOLOTAREV, E. I.,** Polnoe sobranie sochineniĭ  
Complete collected works, Izd. AN SSSR,

Vol. 1, 1931, 433 pp., 1000 c.;

Vol. 2, 1932, 364 pp., 1000 c.

**Subject Index**

## SUBJECT INDEX

The following categories of subjects have been adapted from the monthly table of contents of "Mathematical Reviews." Placement of the books in their respective categories has usually been on the basis of their titles.

### 1) HISTORY

Chebyshev c; Geronimus c; Gnedenko a, c; Kagan a, d; Kol'man; Kolmogorov b; Kotel'nikov and Pok; Markushevich b; Nestorovich; Otradnykh a, b; Rybkin and Ushkevich; Smirnov and Kul'shko.

#### a) Bibliography

Akademika nauk SSSR b, c, d, e; Anonymous a, c; Gerasimova; Golubev and Leibenzon; A. N. Krylov a; Kurosh c; Kurosh and Markushevich and Rashevskii; Nauchno-Issledovatel'skii Kritikobibliograficheskii Institut; Vlasov and Golubev and Moiseev.

#### b) Collected Papers

Akademika nauk SSSR a, f; Aleksandrov and Markushevich and Khinchin; Anonymous b; Bernshtein d; Chaplygin a, b; N. G. Chebotarev e; Chebyshev d, e, g; Galerkin b; Gromeka; Kochin a; Kovalevskaya; A. N. Krylov b; P. N. Lebedev; Leibenzon d; A. M. Ljapunov c, d; Lobachevskii; Luzin e; Merisalov a; Ostrogradskii b; Petrovskii a; Romanovskii g; Umov; Uryson; I. M. Vinogradov d; Voronoi; Zhukovskii a, b, c, e; Zolotarev.

## 2) FOUNDATIONS

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## 3) ALGEBRA

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## a) Abstract Algebra

N. G. Chebotarëv a, f; Kurosh b; Markov (son) a; L. ĪĀ. Okunev a, b; G. E. Shilov a; Shmidt a; Sushkevich c.

## b) Theory of groups

P. S. Aleksandrov a; N. G. Chebotarëv b; Gel'fand and Naĭmark; Kurosh a; Novikov; Pontriagin a; Raĭkov; Shmidt b, c; Sushkevich b.

## 4) NUMBER THEORY

Arnol'd; Chebyshev d, e; Chudakov; Delone a; Delone and Faddeev; Dyukin and Uspenskiĭ; Gel'fond a, c; Khinchin a, g, h; Khua-Lo-Ken; Kudrĭavtsev; Markov a, b; Shnirel'man; Sulakvelidze; Sushkevich a; Venkov; I. M. Vinogradov a, b, c, d; Vorob'ev.



## §5. ANALYSIS

## 5) ANALYSIS

Akhiezer and Kreĭn; Chaplygin b; Chebyshev c, d, e;  
Demidovich; Evgrafov; Gantmakher and Kreĭn; Āglom  
and Āglom; Khinchin f, k; Korovkin; Kryzhanovskii;  
Lobachevskii; Mitropol'skii; Nemytskii and Slutskii  
and Cherkasov; Ostrogradskii a; V. I. Smirnov a.

## a) Calculus

Aleksandrov and Markushevich and Khinchin; Berman;  
Dubnov; Fikhtengol'ts and Natanson; Glivenko a; Kochin  
b; I. V. Natanson; Ryshik and Gradshteĭn; G. E. Shilov  
c; Timofeev; Tolstov a.

## b) Theory of Sets, Theory of Functions of a Real Variable

P. S. Aleksandrov c; Aleksandrov and Kolmogorov;  
Keldysh; Kharadze; A. A. Lĭapunov; Luzin a, b, c, e,  
f; Mergel'san; I. P. Natanson a, b.

## c) Theory of Functions of Complex Variables

Adamard; Chebotarĕv and Meĭman; Fuks a, b; Fuks  
and Levin; Fuks and Shabat; Goluzin a, b, c; Ānchev-  
skii; Lavrent'ev; Lavrent'ev and Shabat; Markushevich  
a, b, c; Privalov d, e; Shagin'san; V. I. Smirnov b;  
Volkovskii.

## d) Theory of Series

Bari; Kangro.

## e) Fourier Series and Generalizations, Integral Transforms

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Kantorovich a; Kontorovich; Leont'ev; Levitan b;  
Lopshits; Lur'e b; Luzin d; Men'shov; Moiseev a;  
Nikol'skii; Privalov a; Raĭkov; Tolstov b; I. M.  
Vinogradov c.

## f) Polynomials, Polynomial Approximations

Akhiezer b; S. N. Bernshtein a, c; Chebyshev f; Geronimus a, b; Goncharov a; Kharadze; Leont'ev; Nemchinov; Remez; V. G. Vlasov.

## g) Special Functions

Akhiezer c; Faddeeva and Gavurin; Khelifets; R. O. Kuz'min b; N. N. Lebedev b; Lifsternik and Akushskii and Ditkin; Rozet; Ryshik; Samoïlova-Ėkhontova; Sergeev; Shpil'raïn; Shtaerman a; Sikorskiĭ b; Sonin; Zhuravskii.

## h) Harmonic Functions, Potential Theory

N. I. Idel'son; Landau and Lifshits b; A. M. Lifapunov b; Privalov c; Serebrennikov; Sretenskiĭ b.

## i) Differential Equations

Artem'ev; Bifsadze; Chaplygin f; Egorov a; Ėl'sgol'ts a; Erugin (?); Gfuntet b; Golubev b; Kantorovich and Krylov; Koshl'sakov; Kravchuk; A. N. Krylov d; N. M. Krylov a, b, c; N. M. Krylov and Bogol'subov a, b, c, d; Kupradze a; Ladyzhenskaja; Lappo-Danilevskii; Lavrent'ev; Levin and Grosberg; Levitan a; Malkin a, b; Matveev; Mikeladze a, b; Moiseev b; Myshkis; Naïmark; Nemytskiĭ and Stepanov; Oppokov a; Panov; Petrovskii b, c; A. A. Popov a (?); Rashevskii b; Romanovskii c; Sikorskiĭ a; M. M. Smirnov; Sobolev a; Stepanov a, b; Tikhonov and Samarskiĭ; I. N. Vekua.

## j) Difference Equations, Special Functional Equations

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k) Integral Equations

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l) Functional Analysis

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m) Calculus of Variations

Akhiezer d; Bogolubov a; Bukreev a; Egorov b; El'sgol'ts b; Gunt'er c; Lavrent'ev and Ljusternik a, b; Ljusternik b; Ljusternik and Shnirel'man; Mikhailin e, f; Smirnov and Kantorovich and Krylov; N. V. Smirnov.

n) Theory of Probability

S. N. Bernshtein b; Boev; Bukhman and Podgorodetskii and Ostroukhov; A. S. Chebotarev; Chebyshev a; Dunin-Barkovskii and Smirnov; Dynkin and Uspenskii; Glivenko; Glivenko b, c; Gnedenko b; Gnedenko and Khinchin; Gnedenko and Kolmogorov; Goncharov b; Kantorovich b; Khinchin b, c, d, e; Kolmogorov a; Landau and Lifshits c; Markov b; Romanovskii b, f; Sarymsakov; Slutskii; N. V. Smirnov; Solodovnikov; Unkovskii.

o) Mathematical Statistics

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## 6) TOPOLOGY

P. S. Aleksandrov b; Aleksandrov and Efremovich;  
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penskii; Lfusternik b; Lfusternik and Shnirel'man;  
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## 7) GEOMETRY

Adamard; Bogomolov; Bukreev b; Delone c; Dubnov;  
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Gradshteyn; Ĭaglom and Bolt'sanskiĭ; Kagan a, d; Lo-  
bachevskii; Nestorovich; Norden c, d; Rashevskii b;  
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b; Pogorelov a, c; Rashevskii a, c; Rumer; Shirokov;  
Vygodskii; Zhitomirskii and L'vovskii and Milinskiĭ.

8) NUMERICAL AND GRAPHICAL METHODS

Akhiezer b; Anonymous i; Bezikovich b; Bleikh and Melan; Bradis; Braginskiĭ; Chaplygin f; Faddeeva; Gantmakher; Gersevanov; Goncharov a; Kantorovich c; Kantorovich and Krylov; Kitaigorodskii; A. N. Krylov c, e; N. M. Krylov b; Latysheva; Levkovich; Lfusternik and Ditkin; Lopshits; Matveer; Melent'ev; Mikeladze a, c, d; Mikhlin e; Oppokov a, b; Panov; Remez; Serebrennikov; Shafarevich; V. I. Smirnov b; Vetchinkin and Kogan; V. G. Vlasov.

a) Tables

Abramov; Akademiia nauk SSSR g; Andreev a, b; Anonymous e, f, g, h, j; Faddeeva and Gavurin; Faddeeva and Terent'ev; Filonenko and Bashkov; Gauss; Ivanov; Karmazina; Karpov a, b; Khelfets; Khrenov; Lfusternik and Akushskii and Ditkin; Neishuler a, b, c; Osipov; Samoilova - Akhontova; Segal and Semendiaev; Shpil'raĭn; Shumiĭgskii; Slutskii.

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## b) Dynamics, Theory of Oscillations

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## 12) HANDBOOKS OF GENERAL FORMULAS

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### ERRATA

- p. 15, l. 14. Add: AKIMOV, M. I., and others Teoretiches-  
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- p. 16, l. 14. Change 1,000 to 2,000
- p. 17, l. 4. Change 1936 to 1937
- p. 17, l. 20. Change perexoda to perekhoda
- p. 18. (Artobolevskii b) Change mekhanizmov
- p. 20, l. 12. Change Strolizdat to Stroizdat
- p. 21, l. 1. Change 1947 to 1948
- p. 22, l. 23. Change Part 1 to Part 2
- p. 32. (Fuks, B. A. a) Change 1947 to 1948
- p. 38 (Goncharov b) Change Gos. to Izd.
- p. 38 (Grave b, Vol. 2) Change 1939 to 1938
- p. 52 (Kurosh b) Change 15,000 to 40,000
- p. 54 (Lavrent'ev and Lüsternik b) Change MR Vol. 16,  
p. 355. to MR Vol. 13, p. 50; 1st ed. 1938, 192 pp.
- p. 54, l. 21. Add: LAVRENT'EV, M. A. and SHABAT, B. V.  
Metody teorii funktsii kompleksnogo peremennogo  
Methods of the theory of functions of a complex variable  
G., 1951, 606 pp., 10,000 c. (MR Vol. 14, p. 457.)
- p. 55 (Lekhnitskii b) Change Anizotropnoga to ...nogo
- p. 67 (Nekrasov c) Change ustanovivhegosia to ...shegosia

- p. 74 (Romanovskii c) Change Ordzhonikidze to ...ikidze
- p. 75 (Rubinim) Change RUBINIM to RUBININ
- p. 79 (Shirkov) Change SHIRKOV to SHIROKOV
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- p. 99, l. 22. Change Khinchin b, c, d, e; to Khinchin b, c, d, e, l;
- p. 101, l. 7. Change Matveer; to Matveev;
- p. 103 (Elasticity, Plasticity) Change Mikeladze b; to Mikeladze b, c;